



LESSON 10. ROVER RACES

Student Guide

(A) Student Worksheet. Rover Driver Command and Information Sheet

1. Walk through the simulated Mars' surface obstacle course. Write down the commands the rover should follow. Count your steps and be sure to list where the rover needs to make a turn on the course.
2. When the rover is in the correct position to retrieve a rock, you may ask the last person in the rover to pick up the rock for bonus points. Use the command "Rock Sample Retrieval Left" or "Rock Sample Retrieval Right."
3. The rover will only be able to follow your set of written commands. The commands to the rover cannot be any different from what you have written.

Rover Commands:

Right	(R)	Left	(L)
Backward	(B)	Forward	(F)
Stop	(S)	Rock Sample Retrieval	(RSR)

Commands: (Example: 1. Forward 3 steps. Stop. 2. Turn left 1 step. Stop.....)

- | | |
|-----|-----|
| 1. | 11. |
| 2. | 12. |
| 3. | 13. |
| 4. | 14. |
| 5. | 15. |
| 6. | 16. |
| 7. | 17. |
| 8. | 18. |
| 9. | 19. |
| 10. | 20. |

**LESSON 10. ROVER RACES****Student Guide****(B) Student Worksheet. Official's Record**

1. Make a counting (tally) mark (example: III...) every time the first person in your rover team steps on a tile (simulated Mars surface). These are called foot faults. Keep track through the entire course. And count up the marks to make a total after your rover team crosses the finish line.

NAME OF ROVER DRIVER:

NAME OF ROVER TEAM OFFICIAL:

NAME OF ROVER TEAM TIMER:

TOTAL FOOT FAULTS (steps on tiles by first person in rover):

**TOTAL TIME FOR ROVER TEAM TO
COMPLETE COURSE:**

TOTAL ROCK SAMPLES COLLECTED:

**LESSON 10. ROVER RACES****Student Guide****(C) Student Worksheet. Rover Team Evaluation – First Race**

As a class, complete the following after your Rover Team has completed the first race of Rover Races.

1. **Brainstorm some of the challenges you experienced during your first Rover Race and the potential causes of these challenges.**

2. **What are the suggested changes for the Rover Team's next drive?**



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(D) Student Worksheet. Rover Team Evaluation – Second Race

As a class, complete the following after the Rover Team has completed the second round of Rover Races.

1. Which changes worked well and why?

2. Which changes did not work well and why?

3. If you could do a 3rd race, what changes would you use to make your Rover move where you want it to go?

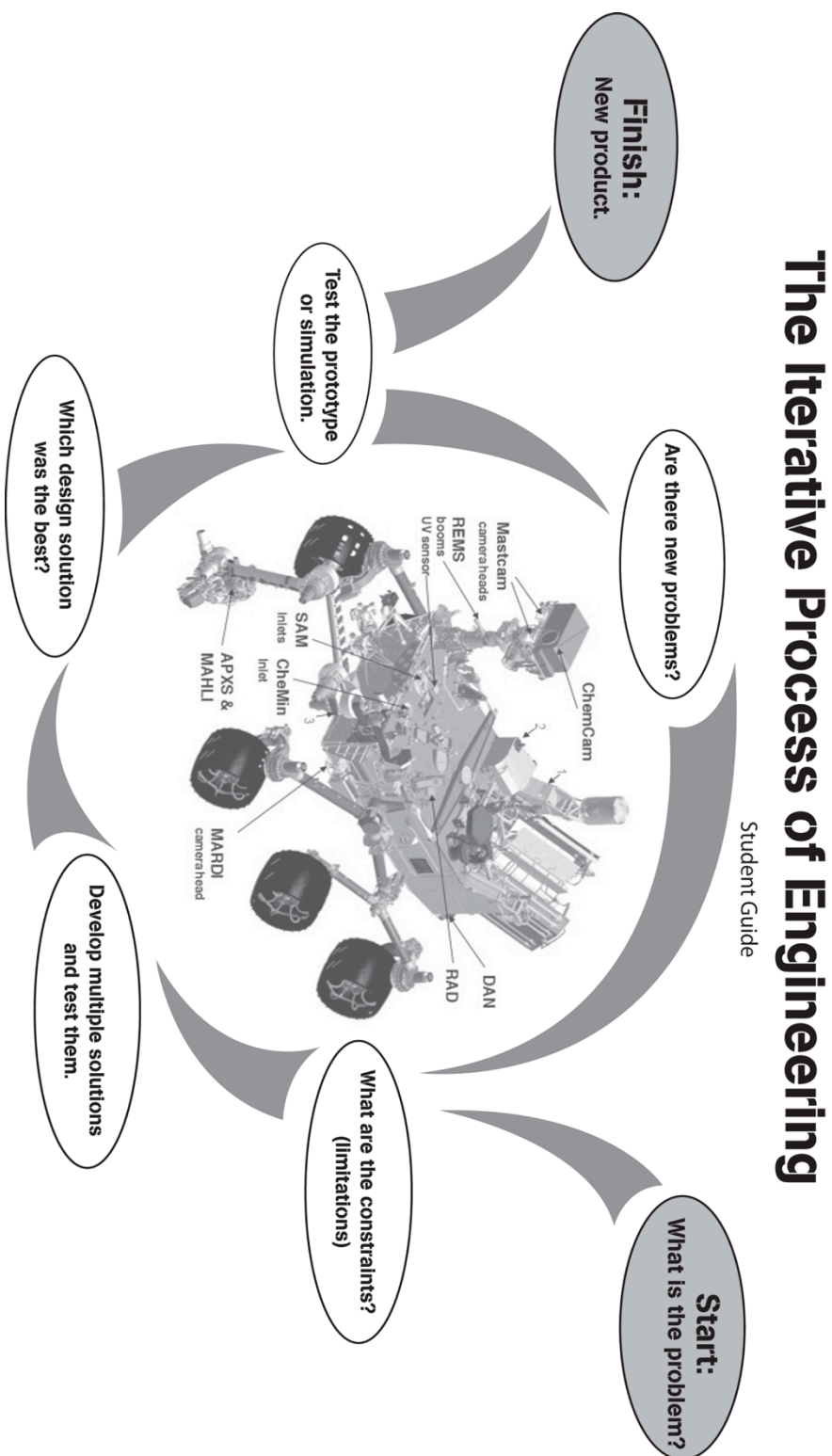


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(E) Student Handout. Iterative Process of Engineering

National Aeronautics and Space Administration



**LESSON 10. ROVER RACES****Student Guide****(F) Student Worksheet. Final Evaluation**

Your teacher will read a paragraph and show a video clip or two. Answer the following questions using everything you have learned today.

Identifying a problem: Name at least 2 problems that needed to be solved for the team to develop successful communication to your rover.

- 1.
- 2.

Specifying constraints (limitations) and criteria for the desired solution: What were some of the requirements (constraints and criteria) you needed to consider for your solutions? For example, worked for all 3 student rovers, not just for 1 person.

Develop a design plan, produce and test models (physical and/or computer generated):
Did you create a physical or a computer generated design plan?

Select the best option among alternative design features:

How many different options did your group identify to solve this particular problem? _____
Which did your group choose and why?

Redefine the design ideas based on the performance of a prototype or simulation:

After your group tried out the new design to solve your problem, did it solve the problem? What new changes would you like to try out to make this solution better?